High-resolution satellite microwave radar observation of climate-rcl:ltc[] sea-ice anomalies

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Since 1991 a suite of international satellites have collected large amounts of high-resolution microwave radar images over Arctic and Antarctic sea ice. Additionally, with the recent successful launch of the NASA NSCAT mission, weather-independent global sea-ice data can be collected and archival in the US. The advantages which radar scatterometer data offer over their 25 km passive, microwave counterpart is that sea-ice information retrieval is independent of atmospheric water vapour content and with new imaging techniques approach a significantly higher resolution (~3-6 km). Together with complementary synthetic aperture radar (S AR) 100 m resolution microwave imaging, the.sc data provide a powerful tool for addressing the characteristics of sea ice which directly influence the polar oceans and climate.

Snow-covered sea-ice characteristics of particular importance with relationship to climate are; its albedo, its mobility and dynamics, and its capacity to redistribute heat, salt and freshwater in the ocean. Brief examples are used 10 illustrate the application of these. data in retrieval of information cm;

- Temporal and spatial variability in large-scale sea-ice kinematics
- Albedo-related tracking of melt and freeze traditions
- Grounded iceberg-induced variability
- Open-ocean polynyas: dynamics vs. thermodynamics

1 ligh resolution radar data are able to address interannual variability in ice characteristics formerly irretrievable from passive microwave data. Whereas originally only ice extent and broad proxy classes of thickness could be recognized, dynamic and thermodynamic source and sink terms can now bc directly addressed, in relation to synop(ic-scale ocean and atmospheric forcing. In association with coupled dynamic-thermodynamic sea-ice models, these data may bc used to investigate sea-ice not only as a passive receptor for climatic disturbances, but also as a purveyor of climatic anomalies throughout the ocean-atmosphere system.